

What is claimed is:

- 1 1. A system for adjusting the trim associated with a control surface in an aircraft, said
2 aircraft having a primary control system; said system for adjusting the trim comprising:
3 a control servo coupled to said primary control system through a coupling
4 device;
5 a trim sensor within said coupling device, said trim sensor producing a trim
6 signal responsive to force transmitted through said coupling device;
7 a trim servo responsive to said trim signal for adjusting trim position in
8 accordance with said trim signal.
- 1 2. A system as in claim 1 wherein said coupling device is a link
- 1 3. A system as in claim 2 wherein said trim sensor is included in said link.
- 1 4. A system as in claim 3 wherein said link is a push-pull rod.
- 1 5. A system as in claim 3 wherein said sensor comprises:
2 a flexible portion having a flexing response to force transmitted through said
3 link;
4 a sensor producing a trim signal responsive to said flexing response of said
5 flexible portion.
- 1 6. A system as in claim 5 wherein said flexible portion produces a rotational response
2 to force transmitted through said link.
- 1 7. A system as in claim 5 having a portion disposed transverse to the force transmitted
2 through said coupling device, said transverse portion coupled to said flexible portion and
3 responsive to said flexing response, and said sensor coupled to said transverse portion.

- 1 8. A system as in claim 5 wherein the sensor is an optical sensor.
- 1 9. A system as in claim 8 wherein the sensor includes two optical sensors.
- 1 10. A system as in claim 5 wherein the sensor includes a switch.
- 1 11. A system as in claim 2 wherein said trim sensor includes a switch.
- 1 12. A system as in claim 2 wherein said trim signal includes a response portion that is
2 proportional to the force to be measured.
- 1 13. A system as in claim 2 wherein said trim signal includes a response portion having
2 hysteresis.
- 1 14. A system as in claim 2 wherein said trim signal includes a response portion having a
2 dead zone.
- 1 15. A system as in claim 2 wherein said link is coupled to a primary control cable.
- 1 16. A system as in claim 15 wherein said link is coupled through a cable attaching device
2 comprising a bar.
- 1 17. A system as in claim 2 including a second trim sensor, said second trim sensor
2 producing a second trim signal; said servo being responsive to said second trim signal,
3 wherein said first trim sensor and said second trim sensor are separate and independent.
- 1 18. A system as in claim 17 wherein said trim servo adjusts trim position only when said
2 first trim sensor and said second trim sensor agree in direction.

1 19. A system as in claim 17 wherein said second trim sensor is included in said coupling
2 device.

1 20. A system as in claim 17 wherein said second trim sensor is included in said control
2 servo.

1 21. A system as in claim 20 wherein said second trim sensor is an electronic sensor.

1 22. A system as in claim 17 wherein said second trim sensor is electromechanical.

1 23. A system as in claim 17 wherein one of said first trim sensor or said second trim
2 sensor provides direction information only.

1 24. A system as in claim 23 wherein one of said first trim sensor or said second trim
2 sensor includes a switch.

1 25. A system as in claim 2 including a first trim controller; said first trim controller
2 responsive to said first trim sensor, and said trim servo responsive to said first trim
3 controller.

1 26. A system as in claim 25 wherein said first trim controller provides a pulsed output to
2 drive said trim servo.

1 27. A system as in claim 25 wherein said first trim controller is responsive only to the
2 polarity of said first trim signal.

1 28. A system as in claim 25 wherein said first trim controller includes a hysteresis
2 response to said first trim signal.

1 29. A system as in claim 25 wherein said first trim controller includes a dead zone
2 response to said first trim signal.

1 30. A system as in claim 25 wherein said first trim controller provides an output
2 proportional to said first trim signal.

1 31. A system as in claim 30 wherein said output is a pulsed output having a variable duty
2 cycle wherein the duty cycle is proportional to said first trim signal.

1 32. A system as in claim 25 further including a signal from an autopilot wherein said first
2 trim controller is responsive to said autopilot signal and said first trim controller adjusts
3 the trim only when said autopilot signal is present.

1 33. A system for adjusting the trim for a control surface comprising:
2 a first trim sensor responsive to the control force acting on said control
3 surface;
4 a second trim sensor responsive to the control force acting on said control
5 surface, said second trim sensor separate and independent from said first trim sensor;
6 a trim servo responsive to said first trim sensor and said second trim sensor;
7 wherein said trim servo adjusts trim only when said first trim sensor and said second trim
8 sensor agree in direction.

1 34. A method for adjusting the trim associated with a control surface comprising the steps
2 of:
3 Generating a first trim signal using a first trim sensor;
4 Generating a second trim signal using a second trim sensor, wherein said second
5 trim sensor is separate and independent from said first trim sensor with respect to failure
6 modes;
7 Adjusting said trim only when said first trim signal and said second trim signal
8 agree in direction.